

## CLAIMS

1. A mesh access network, comprising:
  - 5 at least one base-station comprising a plurality of sectors;
    - each sector comprising of a plurality of terminal nodes, said terminal nodes comprising both indoor terminal nodes and outdoor terminal nodes, and comprising a plurality of outdoor repeaters;
    - wherein said nodes in each sector are arranged in a tree structure starting from said base-station;
    - 10 wherein said base-station sectors use different frequency bands that are located in alternate sectors of said base-station; and
    - a module for interference management and sector reuse comprising network management of frequency, time, and directionality.
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2. The network of Claim 1, comprising:
  - at least one Base-Station → Level1-repeaters link; and
  - at least one Repeater → Repeater/Terminal or Base-station → Terminal link.
- 20 3. The network of Claim 2, wherein said Base-Station → Level1-repeaters link can be active in all sectors in all cells simultaneously due to of transmitter and receiver antenna directionality;
  - wherein a predetermined percentage of all time-slots are preferably reserved for Base-Station → Level1-repeaters links.
- 25 4. The network of Claim 2, wherein said in-sector Repeater → Repeater/Terminal or Base-station → Terminal link is active only in an assigned time-slot;

wherein said repeaters distribute data packets to/from terminals in said time-slots by scheduling non-interfering links to transmit at a same time.

5. The network of Claim 1, wherein a sector of each base-station having a first  
frequency band is at least a cell radius away from another sector having said first  
frequency band.

6. The network of Claim 1, wherein sectors with a same carrier and time-slot  
assignment are located a cell radius away from each other.

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7. The network of Claim 1, wherein communication with nodes in a sector that  
cannot communicate directly with said base-station is done through a first set of  
repeaters in a sector;

wherein data packets from said base-station to a node are switched to said  
15 node through multiple hops; and

wherein data packets from a node are transmitted through multiple hops to  
said base-station.

20 8. The network of Claim 1, wherein capacity of a base-station is increased by  
adding more carriers.

9. The network of Claim 7, wherein carriers are added sector by sector;  
wherein a different base-station radio is provided for each sector for each  
carrier.

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10. The network of Claim 9, wherein at least a second set of first level repeaters is provided to communicate with said base-station on different carriers at the same time.
  - 5     11. The network of Claim 9, wherein other nodes in each sector must switch to different carriers for in-sector time-slots.
  12. The network of Claim 1, wherein each sector in said network represents a tree structure rooted at said base-station.
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13. The network of Claim 1, further comprising:
    - a plurality of links that use any of two types of time-slots for communication, wherein said time slots comprise long time slots and short time slots.
  - 15     14. The network of Claim 13, wherein long time-slots are spectrally efficient and are adapted to transmit a large number of bytes in each time-slot.
  16. The network of Claim 14, wherein said base-station communicates with level-1 repeaters (R1) using long time-slots, wherein said time-slots carry substantially all packets in said network destined to/from repeaters and terminals connected thereto.
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  17. The network of Claim 16, wherein short time-slots have about 20% the capacity and 25% the duration of the long time-slots.
- 25     17. The network of Claim 16, wherein substantially all Repeater → Repeater/Terminal and Base-station → Terminal links use short time-slots.

18. The network of Claim 16, wherein short time-slots are time-multiplexed to maximize utilization of spectrum and reduce latency.